

**Problem Solving Rubric (12/4/07)**

	1	3	5
math - basic add/sub/mult/div	struggles with computations. Works out by hand slowly.		breezes through any calcs that require basic math.
Math - equation formation	Has a terrible time writing down a formula to figure out something like miles per hour if given 15 miles in 1/2 an hour.		easily (seemingly without thought) writes down and uses formulae
Reading comprehension	Answered a different question than what the survey asked. Got different information from the story than was written.		Read easily and responded appropriately without any misunderstandings or misinterpretations.
Spatial – mapping	Considered locations to be in a straight line. Do not realize blocks have three dimensions. Only think of height and length.		Realized locations on survey were in a triangle. When doing pyramid interviews much easier to see with Geometry of pyramid. Most did calculations for a triangle or pyramid shell w/out interior
Previously known facts	Stated knowledge learned elsewhere incorrectly and with confidence several times.		Every piece of knowledge they brought to the interview was accurate.
Real World knowledge	Appears to have never stepped foot out of the building. Does not have any knowledge of factors that could affect a real everyday problem.		Has general knowledge of how things work and are aware that wind resistance could slow things down or the ground is bumpy or gas smells, etc...
Knowledge of own strengths	States that they are good at something that they are not!	Can identify one or two dominant strengths but not a lot of them.	Is able to accurately identify several of their strengths not just one or two. Gives a fairly cohesive picture of their own PS skills
Knowledge of own weaknesses	States that they are not strong in an area that they are.	Can identify one or two dominant weaknesses but not a lot of them.	Is able to accurately identify several of their weaknesses not just one or two. Gives a fairly cohesive picture of their own PS skills
Number sense (Numbers have meaning)	Will state two numbers in the same sentence and clearly indicate that the numbers have no meaning for them. The plane goes 30 mi/hr so... Planes are faster than cars so it makes more sense to fly.		When they see a number or calculate a number it immediately translates into useful physical meaning that guides their planning.

Estimation (can they do it - knowledge)	When trying to estimate, they could not do it.	Could do estimates quickly and easily as they worked through other more difficult tasks or if prompted.
Ability to analyze interns	Analysis of interns has very little to do with their actual actions	Can accurately describe each intern and her strengths and weaknesses.
Acquires info 1st time through	Keeps looking back at story. Has to check for all facts. Does not remember entire scenario	Reads through once and remembers scenario as well as what facts have been told and specific values of facts in most cases.
Plan ideas (What – ask questions)	Does not know where to start. Can't even put info together into enough coherent thought to create a single question to start with or item to find.	Can think of all kinds of things that one must figure out before solving the problem.
Plan - way to get answer (How)	May have figured out a plan or may see a specific question but have no idea how to get the answer. Doesn't even know what facts or ideas might apply.	Once they are told (or figure out on their own) what is needed, they can easily determine a plan and carry it out (formula etc) to find the answer to that specific question.
Plan - big picture (Visualization)	Looks at problem as bits and pieces with no evidence of time passing by. Thinks the setting is the same before take off as after 2 hours of flying. Can't 'see' past what is specifically stated in the problem and doesn't tie it together into one coherent story.	Visualizes the problem in motion like a movie in their head. This helps them think of important details and to coordinate things in space and time. Tied to 'ties in personal experience'
Keep problem framework in mind	Has a plan on how to solve and what needs solved. Then after working out some bits, forgets the things they needed to get and thinks they are done	Remembers all the parts of the question and even with many calculations needed, keeps moving and does not believe they are done until they actually have answered all the questions
Connects steps and pieces	Can solve for specific items but cannot figure out where or how to use the pieces to find a solution	Puts ideas and solutions to parts of the problem together without effort
Check calculations of others	Does not check any of their own or supplied calculations	Checks all calculations supplied and those of their own.

aware of how others helped	Thinks they thought of everything on their own. Does not give credit at the end after important facts that they used were provided by the interns (or maybe you the interviewer) even if they are asked specifically - what about the gas tank?	Remembers a few things or remembers after being reminded "what about the gas tank" "oh yea, they did point that out to me."	Knows exactly what they forgot or hadn't noticed or hadn't thought of until the problem supplied it.
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Meta-process	Had no idea what they had done and never looked back to consider if they were on the right track		Took time at regular intervals to stop and say, am I headed the right direction still? IS what I'm doing useful for solution
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Skepticism (pertains to info being delivered to the solver – trust in source) Do they evaluate info given	Believes whatever is told to them. If the character says something different from what they've already figured out, will immediately question themselves and assume they must be wrong and the outside person correct. Will really struggle to find why the character is right and question self before anything written even from a made up intern in my survey.		Always checks new information based on its reasonableness as well as looking for another source to corroborate the information.
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Estimation (Do they do it - process)	Never tried to estimate anything		Estimated values before calculating anything or to check that they're approximately on the right track.
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Creativity	Follows one obvious path and cannot think of any other ways or sometimes not even one way without guidance		Can think of other possible solutions or routes to explore. Even outside of the box. The entire trip has been planned around using a plane that can land in a field but thinks of flying to a nearby road and using a car to return seems to require rare creativity.
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Adaptability (shift gears if someone else or problem requires a new direction)	A new scenario is presented halfway through problem solution and the student will not consider it even if it makes logical sense. Keeps coming back to question it or outright rejects the change	Student hears new scenario, thinks a bit about facts to see if possible and then quickly integrates new idea into their current plan.
Can throw out useless info	Trys to use everything just because its' there. Gets lost in detail. Can't identify level of importance	Will find what is needed and ignore residual info.
Judgment of reasonable issues/info - is it material? (Pertains to value of actual info either given or calculated) can they evaluate it effectively?	Will think of a possible detail and dwell on it. Will actually say this could affect the payload of 120 lbs by half a pound. That puts them over and will ruin everything.	When evaluating a possible difficulty with a problem or possible factor that may impact the problem, is able to decide if something will have a material impact
Judgment of importance of number values (is it material?)	Will calculate or find information about a factor that could affect the problem but has no ability to see that a difference in weight of 1/2 pound does not matter when the maximum payload is 210 lbs. Considers this factor that adds ½ a pound to the payload enough to ruin that solution plan.	Is able to judge whether a factor is material. Does it impact the situation enough to be noticed?
Tie in personal experiences	Someone who appears to have no life outside of the classroom. Only uses what has been taught in science or math class. Doesn't even think about the outdoors while doing survey. If asked directly the person has outside experience but is not comfortable using it because they don't feel that they can use anything that was not stated.	Thinks of all sorts of factors that could influence this scenario. This category is closely related to big picture.
Tie in info provided by another	When someone offers a new idea or piece of info, they either outright reject it or just ignore it. Everything must come from the solver on their own. Usually they just don't know how to use info.	When they hear something new they immediately evaluate it's usefulness and figure out how it affects their plans.

Scientific Process (each step justified with evidence not by gut feeling)	Will follow a plan or use an answer because it seems right. Even if it contradicts something else they have determined.		Must have a basis for what they use and each step must follow a path. If something has a problem, they fix it before moving onto the next step.
Remember previously noted facts	Will comment on a fact from the story and later need it and not remember what it is and at times that they even knew that bit of information.		Once they comment on a fact or bit of info they remember it
Remember what s/he has calculated or reasoned	Will calculate a value and need it later but does not remember what it was. Other example is figure out part of a scenario or plan and later need this and not even remember that they had it.		Whatever info they calculate, they know they know and remember what it was.
Confidence	Not sure of themselves or their answers. Always asking for reassurance to the point of interfering with progress.		Very confident in what they do (even when wrong) Never second guessing. Totally comfortable with stating facts or answers
Attribution (who's to blame for their failure)	Everyone else messed them up. Dust in their eye etc..		Takes responsibility for their own shortcomings.
Judgment of information based on the source	Will not believe anything that comes from someone s/he's determined to be stupid. To the point that s/he will refuse to use an idea (even a good one) if it comes from someone he's decided is stupid.		Looks at all new information with an open mind. May consider the value of the source but still evaluates info on its own merit.
Wanting to find the best solution to the problem for self	Not bothered one bit if they can't or don't find the answer. Could be worried about what interviewer thinks but the idea of a solution is not of interest to them at all.	May want to find the solution but doesn't NEED to solve it.	Challenged by the problem either because of the problem scenario or simply the idea of solving a challenge. It will bother them after they leave if not finished
Wanting to find the best solution to the problem for interviewer	Completely uninterested in what the interviewer thought of them.		Really does not want to let the interviewer down. Wanted to demonstrate their abilities for the interviewer
Wanted to Succeed on 'test'	Wanted to leave or just passing time.		Wanted to prove themselves capable
Interested in the context of the problem	Considers the scenario within the problem to be far fetched and/or not important to them personally so not worth their time to think about it.		Finds the scenario within the problem worthwhile.
Enjoyed Solving the problem	Did not like having to solve the problem but could have enjoyed interview just not the problem.		Loved solving it but maybe not analyzing the girls

Enjoyed analyzing interns	Very annoyed by the questions requiring them to think about how the two interns were progressing		Really liked discussing what was going on between the two interns and how they were doing.
Enjoyed complete experience	Some aspect of the interview, either problem, interns or interview made the subject rather not be there.		Enjoyed solving the problem, meeting with the interviewer and analyzing the interns.
Real Life vs. Student	Trapped in the confines of school ideas and the specifics of the problem, observes from the outside and doesn't even consider if or how it could be a real situation doesn't even consider the idea that it could be real and how they would handle it.	Aspects of both	Thinks about things in the big picture as if the problem were real and it matters to someone's life
Careful/Thorough	Answers each question with first thought and does not spend much time considering the ins and outs of the problem.		Takes time with every answer, writes things down and considers each step carefully